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Trend analysis of extratropical cyclones in long-term ERA5 data series (1950-2019)

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Extratropical cyclones are the primary natural hazards affecting Europe. With the release of ERA5 reanalysis data from 1950-1978 by the European Centre for Medium-Range Weather Forecasts (ECMWF), new opportunities have arisen to investigate mid-latitude cyclones in terms of climatic features and trends in longer and higher resolution. We analyze cyclones by nearest neighbor search in 1000 hPa geopotential height minima in different high resolutions for different minimum life-times. We find an intensification of North Atlantic cyclones in 1950-2019. Short-lived cyclones grow in radius and depth. In the Mediterranean, however, long-lived cyclones have weakened; but traveled also further in 1950-2019. Additionally, we illustrate relations between cyclone tracks, radii and correlated weather and climate extremes.